

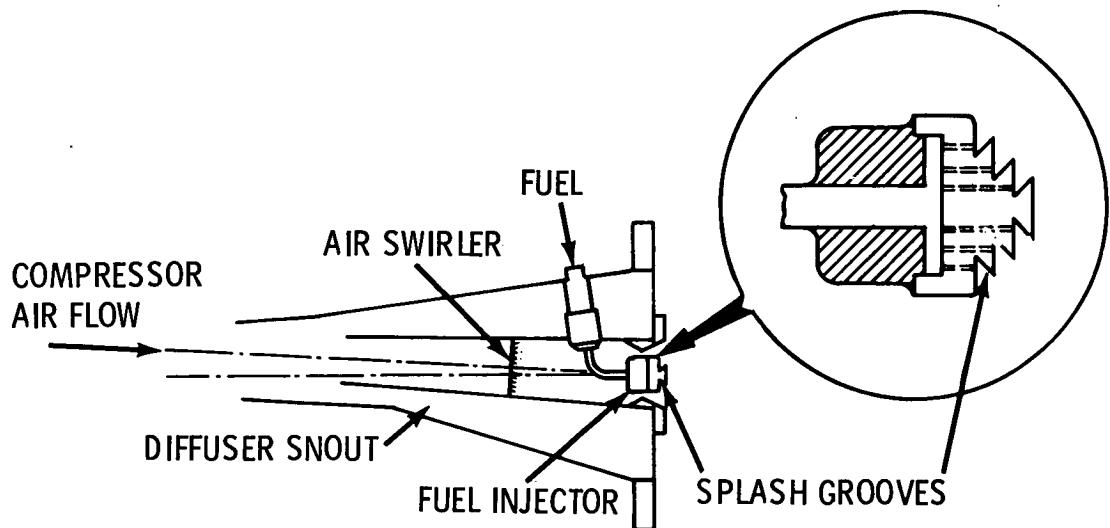
# NASA TECH BRIEF

## Lewis Research Center



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### Improved Air Atomizing Splash-Groove Fuel Injector Reduces Pollutant Emissions from Turbojet Engines



#### AIR-ATOMIZING SPLASH-GROOVE FUEL INJECTOR.

An improved air-atomizing fuel injector has been developed which enhances the contact of liquid fuel with high momentum airstreams. It produces finely atomized sprays which improve performance characteristics and reduce pollutant emissions of advanced high-pressure and high-temperature turbojet engines. Tests have shown that emissions of nitrous-oxide were reduced by 25%, carbon monoxide was reduced by 20%, unburned hydrocarbons were reduced by 30% and smoke was reduced by 45% when compared with other air-atomizing systems.

The fuel injector assembly shown in the figure consists of a diffuser snout which captures a portion of the airflow from the compressor and directs the air through an air swirler and around the splash-groove injector. The air swirler produces a vortex airflow pattern which assists in uniformly distributing the atomized fuel and stabilizing the flame. Low pressure fuel is injected through orifices onto the three grooved portions of the nozzle. The fuel splashes over the lip of each of the three grooves and is

atomized by the swirling airflow as it expands out of the converging-diverging airflow nozzle surrounding the splash-groove injector. The resultant fuel-air mixture is then ignited and burned with the flame attached to the tip of the splash-groove injector. The injector assembly can be used either singly or in combination to provide the required fuel distribution for can combustors, can-annular combustors or annular combustors.

#### Notes:

1. Further information is available in the following report:

NASA TM-X-3255 (N75-27010), Combustor Exhaust Emissions for Air-Atomizing Splash-Groove Fuel Injectors Burning Jet A and Diesel Oil Fuels

(continued overleaf)

Copies may be obtained at cost from:

Aerospace Research Applications Center  
Indiana University  
400 East Seventh Street  
Bloomington, Indiana 47401  
Telephone: 812-337-7833  
Reference: B75-10190

2. Specific technical questions may be directed to:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
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Reference: B75-10190

**Patent Status:**

Inquiries concerning rights for the commercial use of  
this invention should be directed to:

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